

MATHS CLASS XII (Relations and Functions) Continuation.....

General direction for the students :-Whatever be the notes provided , everything must be copied in the Maths Copy and then do the Home work in the same Copy.

EXERCISE 1.3

Q 7. Given $f: R \rightarrow R$ defined as $f(x) = x^4$

We know $-1, 1 \in R$ (domain)

$$\text{Now } f(-1) = 1, f(1) = 1$$

\Rightarrow -1 and 1 are having same image 1.

\Rightarrow not one one.

We know $-5 \in R$ (Codomain)

$$\Rightarrow -5 = x^4$$

Which is not possible for real values because even power leads to positive.

\Rightarrow -5 is not having pre image. Hence it is not onto.

Q 8. Given $A = R - \{2\}$ and $B = R - \{1\}$, $f: A \rightarrow B$ defined by $f(x) = \frac{x-1}{x-2}$

For one one $f(x_1) = f(x_2)$

$$\Rightarrow \frac{x_1-1}{x_1-2} = \frac{x_2-1}{x_2-2}$$

$$\Rightarrow x_1x_2 - 2x_1 - x_2 + 2 = x_1x_2 - x_1 - 2x_2 + 2$$

$$\Rightarrow x_2 - x_1 = 0$$

$$\Rightarrow x_2 = x_1 \Rightarrow f \text{ is one one.}$$

For onto

Codomain, $B = R - \{1\}$

$$y = \frac{x-1}{x-2}$$

$$\Rightarrow xy - 2y = x - 1 \quad \Rightarrow x(y-1) = 2y - 1 \quad \Rightarrow x = \frac{2y-1}{y-1}$$

$$\Rightarrow y \neq 1 \Rightarrow \text{Range} = R - \{1\} = \text{codomain}$$

$\Rightarrow f$ is onto $\Rightarrow f$ is bijective.

Q 12. Given $f: N \rightarrow N$ defined $f(n) = n + 1$, if n is odd. $f(n) = n - 1$, if n is even.

For one one

Case 1.

Let $x, y \in N$ are odd

$$f(x) = f(y)$$

$$\Rightarrow x + 1 = y + 1 \Rightarrow x = y$$

$\Rightarrow f$ is one one when n is odd.

Similarly, f is one one when n is even.

Case 2.

Let x is odd and y is even

$$\Rightarrow f(x) = f(y)$$

$$\Rightarrow x = y \Rightarrow \text{odd} = \text{even}, \text{ which is not possible.}$$

$$\Rightarrow f(x) \neq f(y)$$

Similarly, Let x is even and y is odd $\Rightarrow f(x) \neq f(y)$

On combining all cases f is one one.

For onto

Codomain = N

$$\text{Let } x \text{ is odd } \Rightarrow x = n + 1 \Rightarrow n = x - 1 \text{ is even } \in N$$

$$\text{Let } y \text{ is even } \Rightarrow y = n - 1 \Rightarrow n = y + 1 \text{ is odd } \in N$$

\Rightarrow codomain = Range

Hence it is onto.

Q 24. Given $n(A)=3$, $n(B)=4$

Number of functions $= 4^3 = 64$.

Q 28. Given $n(A) = 3$, $n(B) = 3$

Number of one one onto functions $= 3! = 6$.

Home work : Left over questions from the exercise.

Class 12 Maths